Credit Union Software Project

The credit union software project was the most complex and most significant information technology (IT) activity undertaken during the FOMIR/DAI project. The activity included: software selection, customization and installation; staff selection, hiring, training and organization; procurement and installation of hardware, software and communications technologies. In addition, the activity was undertaken in coordination and cooperation between three credit unions, each of which was undergoing the introduction of a new microcredit technology. Finally, one of the credit unions was in the middle of the regulatory process with the Superintendency of the Financial System (SFS). Despite its complexity, the project was completed successfully, on time and on budget.

This report is a review of the activity to summarize what was done, what worked well, what worked poorly, lessons learned and recommendations for future projects. The following is organized into eight main sections: (I) The Decision to Invest in a New Information System; (II) Selection; (III) The Customization Process – from Evaluation to System Implementation; (IV) Maintenance and On-going Use and Development; (V) Project Management; (VI) Costs and Subsidies; (VII) Superintendence Review and Acceptance; and (VIII) Summary of Lessons Learned and Recommendations. The attached annexes include many of the tools developed and used during the project.

I. The Decision to Invest in a New Information System

Sound and useful information lies at the heart of a successful microfinance institution. Whether manually or using a computerized system, microfinance institutions maintain large amounts of critical business data. Client and financial transaction data must be translated into information on portfolios and efficiency of operations so management can make sound business decisions.

In July 2000, FOMIR signed grant agreements with three local credit unions to provide technical assistance and equipment required by the institutions to develop new micro-finance products and services. In those agreements, FOMIR anticipated the need to assist the Credit Unions in upgrading their internal IT management capacity including procurement of new financial management software and equipment necessary for management of a soon-to-be-regulated financial institution.

The goal of the project was to identify, procure and install new financial services software in the three Credit Unions to provide management and supervisory authorities with information related to the financial services operations the institutions offer. Combined, by mid 2003, the three Credit Unions were serving about 12,000 clients with outstanding loans and over 30,000 clients with deposits through three main offices and seven branches and had plans to expand services to 10 branches and offer credit and debit cards in the near future.

II. The Process of Reviewing the Existing System and Selection of the New One

A. **Reviewing the Existing System**

Following is a summary of the main points considered during the process of evaluation, selection and implementation of a change in the technological platform for these financial intermediaries as well as the conclusions and observations to be considered in similar projects.

What Existed and What Was Missing

During the information gathering and analysis performed at the credit unions, FOMIR/DAI found they lacked an appropriate, fast and powerful system to manage the current business or to manage growth. The systems installed at each cooperative were not integrated; the different modules and agencies were not interconnected. They lacked a data base management system. Closing and balancing the books was performed manually and information from branches was sent via fax or in diskettes. Regarding IT staff, although they managed daily operations, they lacked the ability and knowledge to manage a computer center according to the current and future needs of the institutions and were even less capable of improving the applications being used or developing new systems. Regarding the hardware, it complied with the minimum operational conditions but lacked the capacity to absorb new systems, growth and advanced technology. There were no communications between the branches and the central office due to lack of communications lines and also the systems in use lacked on-line ability and capacity. There were no formal computer center operations policies, procedures, norms, security or programming analysis standards.

Reviewing of Staff, Policies, Procedures of the entire Organization and Requirements for Technology Change

A revision of the organization's staff, policies and operating procedures is one of the most important aspects to be considered and conducted in order to properly evaluate an organization in regards to a major technological change. The user's ability and quality, both in functional and technical knowledge in the corresponding areas, has to meet a minimum standard.

An institution's lack of policies and procedures, throughout the entire organization, would result in an inadequate and incomplete evaluation and selection process. The three cooperatives lacked many operational policies and procedures at the moment of the evaluation. Additionally, they were starting an important change in their credit technology, changing their chart of accounts and several policies, and one was in the middle of a regularization process, which would require it to establish and modify most of its policies and procedures and to document them all. All the three cooperatives lacked manuals with established policies and procedures.

Regarding IT staff, they must meet certain qualifications in order to participate in the project. Otherwise, the institution must be required to train and/or hire adequate personnel in order to perform the corresponding tasks. One of the situations found with the cooperatives was the absence of staff with the proper knowledge on the corresponding functional areas as well as a significant weakness in the IT staff's technical ability and knowledge.

It is better to postpone the start of the project until adequate human resources area in place. Otherwise, the project will result in increased expenses, time, as well as human resources and, in the worst case, the system will end up less than optimal or desirable for the institution.

One important point that must be mentioned is that little time allocated to perform the system diagnostic, review the existing equipment, and work with users to get to know their concerns. Furthermore, it was not closely coordinated with credit consultancy the project was performing and the IT project team did not review or advise the other operational areas. Therefore, a complete review and reengineering of staff, policies and procedures for the entire organization was not achieved as a pre-requisite for the technological change.

Cost-benefit Analysis of Technology Options

As a result of the findings at the institutions regarding the systems, the decision was made to analyze the options of continuing with the system already installed, make improvements to it, develop a new system internally or acquire a new one.

Based on the analysis performed of the existing system, the conclusion was that there was no internal capacity to upgrade it due to the type of technology used and the lack de IT technical knowledge and qualified staff at the institutions. Regarding upgrades to the existing system by a local company or the company that had developed the system, the conclusion was that the costs were high with respect to the benefits as well as the time to perform the work. Regarding hiring a local company to develop a system, the situation was that they lacked the human resources and the knowledge required to develop a strong system. To this it must be added that the institutions had already invested in upgrades and/or attempted to acquire a system that would better meet their current needs and the result was negative with the consequent loss of the investment (time and money). One of the institutions paid the cost of a new product and the result was a system that did not work and could not be integrated with the existing modules, with the aggravating factor that they could not recover the money invested due to the lack of a proper control mechanism for system review and acceptance. At another one of the institutions, after more than a year, it had to return to use the previous system because the new one did not work and the company contracted had left the country, resulting again in loss of money and time.

Taking into consideration the above, the conclusion was that it would be more convenient to look for and select a system that met a high percentage of the institutions' needs and guaranteed the results of the project, in time and cost. For more details on the evaluation and decision, please refer to Annex 1 of this document: Report on ACCOVI's IT Systems (Informe Situación de Sistemas e Informática en ACCOVI).

B. **Selection**

Definition of Requirements, Selection Criteria and the Rating System

A document for system solicitation and selection was prepared for the institutions. This document was based on the system's general requirement scheme and on the CGAP-WOCCU matrix. Additionally, FOMIR/DAI's technical staff developed an evaluation matrix covering

both technical and cost aspects. This document was submitted to the institutions for analysis and improvement, which later was analyzed jointly by both groups in order to reach a final version according to the current and future needs. The same was used as the basic document for the request for proposals.

The primary modules for the new system were: Credit and Loans for Micro and Small Enterprises, Consumers and Housing; Accounting; Cash; Savings and Deposits; Clients; Budget and Management Reports.

These modules were to operate in an integrated system under client/server and data base concepts. Furthermore, FOMIR determined the system should include the following specifications: graphics environment, modular and integrated, data base approach, in Spanish, local support with minimal dependence on the supplier for report modifications. The cooperatives required the system to work with W98/NT or latter, independent databases, fourth generation language, Visual, C++, and SQL at a minimum.

The above mentioned document defined both the content as well as the evaluation and selection criteria to be used for the proposed systems. Annex 2 of this report presents the complete materials used for this process.

Identification of Suppliers

FOMIR/DAI initially investigated US suppliers of banking software. Systems considered included Integrated Banking System (Data Pro), Perot Banking Systems, Phoenix Banking Systems, IBM-SAFE and Kindle Act. These programs were determined to be inappropriate for the following reasons:

- Quoted Prices for basic banking system exceeded $800,000. (Phoenix was lowest).
- Hardware and Platform required for software (operating systems AS400 or S/390) would increase hardware procurement for each credit union by $450,000.
- All vendors listed above produce English language based software designed primarily for the US market.
- None of the vendors mentioned above has vendor or company offices in El Salvador or neighboring countries.
- Technical skills to operate and maintain these systems exceeded capacity of credit union staff and potential new hires.

FOMIR/DAI expanded the search for appropriate software to local and regional companies. Six companies were identified that had proven software products that met the above referenced criteria: MACOSA from Ecuador; ENLACE from Ecuador with an office in San Salvador; ARANGO from Panama with a local office (ASI) in San Salvador; SYSDE from Costa Rica; TOP SYSTEM from Uruguay with representation in San Salvador by LA VILLA S.A. DE C.V.; and SYSCOM from El Salvador.

Requesting Proposals

The document used in the request for proposals included the following:
- General terms of reference
- Systems specifications
- Evaluation matrix to be used by FOMIR for evaluation of system
- Formats for presenting financial offers
- Matrix of overall evaluation

All six companies mentioned above were provided with specification documents and invited to submit technical and cost proposals. Proposals were received from three companies: TOP SYSTEMS, SYSCOM and ARANGO (ASI).

Reviewing Proposals, Selecting and Negotiating System and Supplier

On November 27, 2001, FOMIR received proposals from TOP SYSTEMS, SYSCOM and ARANGO (ASI). Full proposals are available for review in the FOMIR-DAI office. The FOMIR technical team (Mr. Gabor Simon, Ms. Enriqueta Claramunt and Mr. Carlos Uribe) reviewed the proposals. Following this review, each vendor also made a presentation of its system to representatives of FOMIR and the credit unions. Individual assessments were conducted followed by a team review. The technical and financial review was presented to FOMIR management on December 20, 2001, at which point it was decided to begin financial negotiations with the top ranked firm - TOP SYSTEMS (TS). On January 10, 2002, FOMIR presented the results of the technical review to representatives of the credit unions and received approval to continue budget negotiations. For a summary of the evaluation of each proposal, please refer to Annex D.

On December 27th, 2001, FOMIR sent TOP SYSTEMS a letter requesting the company consider a price reduction in the cost of the licenses, cost of customization and that they provide more information on how they intended to train credit union staff. On January 7th, TOP SYSTEMS responded with a second offer of $597,170 for the core modules and licenses and customization cost. FOMIR also determined the credit unions would purchase additional data base software (if required) and pay directly the cost for the maintenance agreement. FOMIR sent TOP SYSTEMS a second letter on January 10th, requesting additional cost considerations. On January 14th TOP SYSTEMS responded with a quotation of a final price of $546,400 for required modules, the licenses, and customization cost. Copies of these letters are available for review in the FOMIR project office.

On January 15th, FOMIR presented the credit unions with the final negotiated price for the software. On January 25th the credit unions informed FOMIR/DAI they had approved the procurement and would provide 25% of the total cost of the license, customization and maintenance cost of the system, as per USAID El Salvador's cost sharing agreement, as reflected in DAI's contract with USAID El Salvador and under the terms of the grant agreement each institution holds with FOMIR-DAI.

The four most important lessons from these steps in the process are:
- Good knowledge of the possible suppliers is a must for the future success of the project.

- Detailed analysis and technical evaluation of the product before selection is required to understand and maintain control of the product and the project itself.
- Close analysis of the benefits and constraints of selecting a product that is highly flexible (such as Topaz) versus one that is mainly fill-in-the-blanks for the customization process is required. While the latter requires less expertise from the users, the final product may not be as good as a more flexible product which requires major integration and involvement of the users as well as good knowledge of the functional areas by those that are responsible for system development and use.
- Everything is negotiable.

C. **Defining Contracts**

FOMIR-DAI decided to use a fixed price contract with Top Systems and La Villa to provide software and licenses for use of TOPAZ software, including source codes, to three credit unions served by the project. These licenses are non-exclusive and non-transferable. Along with software, Top Systems provided complete hard copy and electronic versions of the users manuals. Under the licensing and software contract, Top Systems agreed to provide: three principle licenses for the central office of each credit union; six licenses for branch agencies of ACCOVI and ACACU; written commitment with each credit union for licenses for six additional branch agencies to be awarded before December 31, 2004. Annex E contains a sample of the contract for the license and Annex F the contract for the implementation process.

Due to the time spent for the USAID procurement approval and waiver process (approximately five months, due mainly to the source origin project restrictions on third country procurement), the starting date for the project was delayed until the first of July 2002 and the expected end date postponed until the 31st of March 2003. This delay and the information requirements for the waiver and approval required significant technical and administrative input from FOMIR-DAI staff and consultants.

While a fixed price contract is preferable in order to control the project costs and schedule, it requires detailed and exhaustive identification and documentation of all systems requirements up-front and careful monitoring throughout the project. Nonetheless, some flexibility is required for un-expected situations and additional product requirements that arise during product development in order to ensure product quality and functionality.

D. **Specialized External Support for Selecting and Contracting System and Supplier**

An important point to highlight in this process is the contracting of a consultancy to assist with the selection, customization and implementation of the software, which in this case was performed by FOMIR-DAI's IT Unit. Given that these processes are not common in the daily operations of a microfinance institution, such organizations do not generally have staff with the special abilities, necessary knowledge and the time required to dedicate to this intensive work. In these cases, a consultancy dedicated to the strategic and critical areas of the project becomes a crucial factor for the project's progress and acceptable completion.

III.   System Customization Process

A.   Definition de Requirements

Primary Analysis

One of the greatest concerns at the start of the project was how to ensure the early integration between the three cooperatives in a project that requires a high degree of team work, openness, consent, and mutual collaboration during a limited time frame.

The first crucial activity for the process was to hold a strategic meeting, also called the system's primary analysis meeting. The scope of the system and of each one of the products to be developed would be established in this meeting, as well as the degree of the products' customization between each of the cooperatives, and a work team would be set up for the duration of the project. Although the terms of reference already included the expected scope of the application, the involvement of the directors from the cooperatives in this stage of conceptualization of the product design exposed them to active participation and required their participants to become responsible for the decisions made regarding the customization requirements and design of the desired solution.

The assumption was correct: Holding a strategic meeting for two complete days with the three cooperatives' directors and management helped them reach a consensus on the expected scope for the application, and it allowed the preparation of a basic document for the scope, expectations, and general operational agreements between the three cooperatives. The software supplier's project managers and consultants from FOMIR-DAI also participated in this meeting. The approach to teamwork was also established during this meeting and the people from each cooperative responsible for the decisions and definitions in each one of the modules were assigned. These people would also be responsible for the detailed definitions, for the operational staff attendance to run tests, as well as for accepting and validating the modules on behalf of their cooperatives.

It is important to mention that each cooperative had particular strategies for their growth and institutional strengthening and, in that sense, some were more conservative than others regarding change or new services to be launched in the short to medium term. However, most of the topics were common and similar, which allowed for reaching an agreement on the development and customization of a singular system where variations or differences would not surpass 10% of the customized product. Of course, according to the different internal policies and particular conditions with which each service is offered, the products shall be able to be totally be adjusted on their own parameters. One example of the consensus reached was that while one of the three participating cooperatives was in the process of regularization by the SFS and, therefore, had adopted the SFS's chart of accounts, the two remaining cooperatives also decided to change their chart of accounts adopting the standard one from the Superintendency. This consensus would save programming resources and time because as the programmers would be focused only on one accounting product.

Detailed Analysis

The detailed analysis of the requirements was performed during a month long stage with middle management and operations staff from each cooperative. A key aspect in this stage was the attendance at each module of a person responsible from each cooperative to whom senior management had delegated the product's definition, requirements and validations. The intensity of the definition meetings, the high level of openness shown and the degree of collaboration among the three cooperatives was significant for the acceptable development of products appropriate for the institutions' requirements and expectations.

However, it must be mentioned that aspects in this stage had negative consequences on the modules' performance during the parallel and initial production phases. Limitations during this phase observed from both the users and the supplier are summarized below.

From the users:

✓ Non-standard procedures and products with policies that are not followed.

✓ Lack of written policies and outdated regulations at the cooperatives.

✓ Weak credit policies or ambiguity in practice.

✓ Lack of strategic knowledge and vision from area managers.

✓ In the credit area, significant limitations regarding the technical knowledge of some of the cooperatives' participants and lack of definite design of the products being used. These aspects considerably delayed this stage, especially regarding the credit application module.

✓ Least active involvement in this stage by the cooperative with the greatest requirements demands and pressure from the SFS that in the long range delayed the implementation stages and production start-up given the amount of readjustments to operations in this last stage.

From the supplier:

✓ Because it is an open and flexible system and methodology, the supplier provided a limited contribution of "proven" solutions as the result of its previous experience in developing banking systems.

✓ Subsequently limited requirements to what was strictly addressed during this exercise of detailed analysis, although the users expected certain basic aspects of banking control and common processing routines to be given as a standard part of the system offered and hence did not specify these in detail. This subsequently generated setbacks and discussions as the supplier intended to limit the scope of the products by calling the basic operational control requirements of consistency, security or contingencies "additional requirements." This point is related in part to having a fixed price contract based on requirements established in this stage. Thus it is very important to assure that all requirements are clearly identified and described from the outset.

Based on this experience, FOMIR/DAI considers it imperative that prior to the stage of detailed requirements definition, the financial intermediary update all its operational policies, regulations, functions and procedures for the services and products it provides and that these documents be reviewed for clarity and precision. Procedure and functions manuals must exist and be updated, otherwise, the project should consider assigning a person or a team of people

from organization and methods to document processes, policy and regulations definition. It is worth mentioning that such a process had been performed for microcredit, but it was still in different stages of implementation and approval by the cooperatives, and the microcredit portfolio still did not account for a significant percentage of their operations.

On the other hand, it is very important for the person responsible for each module to have the required technical knowledge in his/her area of specialization.

Another aspect that must be widely discussed and clarified is the basis for the banking system, regarding operations control, security, consistency checks and reporting, and data validation routines, basic operations predefined in each module, that shall be assumed independent whether or not they have been addressed in the detailed design of the system. Otherwise, they should be obligatorily addressed by the system supplier as part of the benefits initially offered as part of the system and not expected to be defined from scratch by the user.

B.   **Documentation of the System and Project Status**

A very important aspect during the project was the ample systematic and periodical documentation of the project's status and the methodology of written communication and documentation generated during its duration. This was possible given the standard work methodology previously established by the supplier to follow-up on its projects. A weekly report was issued on the project's status with respect to the original work plan, the positive and negative situations and potential risks, activities performed during the period as well as those still outstanding. Memos or summaries resulting from any meeting held with the cooperatives' management and a Gantt chart on the project's progress with respect to the plan were annexed to the report and, when appropriate, the adjusted plan and any other relevant documentation.

The written documentation with users, combined with meetings with participants and general management when deviations from the plan were observed, involved all levels of the institution to secure results that contributed significantly to the project's success and hence should not be disregarded.

The use of standard templates for activities aided completion of tasks and the communication and documentation of results and agreements reached. Examples of templates were the test matrixes, the approval documents for each one of the modules and the progress reports.

Preparation of users' manuals for each of system's modules is a time consuming task requiring special dedication. As the Topaz system is completely customized for each client, no standardized Topaz users' manual existed. The preparation of these manuals was under the responsibility of the supplier's Project Manager with the support of the programmers and one assistant, which resulted in manuals that could have been better structured and prepared by a specialist. A similar situation happened with the rest of the modules' technical documentation, regarding presentation and detail, given the haste to finish them since the task was given to one of the programmers assigned to the project. Therefore, it is recommended at the time of selecting the system to ask the software supplier to assign dedicated and specialized resources to the task of manual preparation.

A different situation occurred with the TOPAZ technical documentation. These manuals are fairly complete, clear and reasonably well structured as these are standard manuals used at all the software installations.

After two months of operating the system, the technical documentation and users' manuals started to become outdated since a resource to update them after delivery of the system by the supplier was not initially foreseen. Since the cooperatives lack an organization and methods department, they have not been able to assume this responsibility. This outdating has happened mainly because of the significant modifications made at the start of the production phase which should be incorporated into the respective documentation.

C.   **Training (of Programmers and Users)**

The training given during the project can be grouped into four areas:
a) Technical training to develop Topaz applications;
b) Training on SQL Server;
c) Training of users;
d) Training on the system's administration and operation.
Each is described briefly in the following paragraphs.

a) Technical training on Topaz

It was necessary for the cooperatives' IT staff to program data gathering and maintenance screens, as well as the system's data input and output (screens, form, reports, receipts, and vouchers). The start of the training was timely, however it did not last long enough considering the level of results obtained in the customization and testing stages. Although the cooperatives' IT staff's technical level was low, the wide variety of topics and their complexity was the main reason why the training provided only covered the necessary basic elements to perform operations and reports. The resulting cost of the limited training was low quality and efficiency of the cooperatives' programmers' work, which was strongly evidenced in the testing and later stages. It should be recognized that the supplier's technical staff made up for these quality deficiencies by correcting the mistakes and advising cooperative's staff on programming topics.

Therefore, is it essential for systems such as this one, where institutions customize them according to their needs and preferences (input and output: capture screens, maintenance and consultations, forms, vouchers and reports), that the training on system programming be complete and for a reasonably sufficient duration in order to properly prepare the technical staff from the participant institution. For instance, a minimum of two continuous months of training on Topaz would have been appropriate, in addition to previous knowledge and experience of the staff in the database manager SQL Server.

b) Technical training on SQL Server

The previous knowledge of the cooperatives' technical staff in the database manager and on the use of queries is basic. Since the staff lacked previous knowledge, the supplier trained them for

one week, which resulted in insufficient knowledge, as observed especially during the testing and production start-up stages, since the preparation of queries is constant work that facilitates problem and inconsistencies analysis resulting from the system. Even though the supplier supported this aspect, the delays and frustrations due to the problems were evident and the training on these topics was strengthened after the completion of the project when the technical staff was less stressed from the intense tasks of the first months of production start-up.

Besides the additional training, two of the three cooperatives hired additional technical staff with more system programming and management experience and ability.

c) Training of users

The constant involvement of key users in the system's customization, constantly attending tests, discussion on the flow of operations and aspects of the system parameters, allowed some users early familiarization with the system and facilitated their understanding of its use. Therefore, the conclusion is that early training, resulting from the intensive users' participation during the development of the modules' customization, is key in the latter stages in parallel and production start-up. The supplier trained the cooperatives' accounting staff on the special use of this module (recommended by FOMIR and accepted by the supplier after seen the problems that Integral's accounting department experienced when the Topaz accounting module was implemented).

Training of the entire staff was more complex, since it involved not only an explanation of Topaz operations, but also how many of the procedures for which they were responsible for conducting had been redesigned. Therefore, it was decided to train key staff on how they would teach the rest of their colleagues, thus becoming knowledge replicators. This was done, but was not sufficient as the cooperatives' staff collaboration with their fellow workers was not disciplined and in the biggest cooperative it was aggravated by high staff rotation. In view of these situations, the project management proceeded with massive trainings (conducted by Top Systems and FOMIR-DAI consultants), scheduling with each cooperative and coordinating with the general manager activity attendance and discipline.

As a result, Topaz was better and more widely understood, although the lack of clearly established standards and regulations by the cooperatives, added to the high staff rotation in some cases, hindered the staff's understanding of a wide range of processes and their putting into practice the newly acquired knowledge.

The recommendation is, prior to the training, all staff members be properly acquainted with the procedures, policies and regulations, and all pertinent staff be notified of changes in procedures, including changes in duties and responsibilities. This activity should come from management who should maintain systematic and periodic communication with their staff.

d) Operational and management training on the system in production

Neither the supplier nor the project management team had considered operational and management training on the system during the time and resources planning stage; the need

emerged during system production start-up. Programmers had been trained on operations programming but not on design concept relations or system management methodologies. Initially, such training had been limited to a brief explanation on how to execute system closing, at day's end and start, an activity performed during the parallel operation between systems.

To solve this situation, the supplier agreed to provide such training as part of a special support in the post-production stage. Furthermore, the FOMIR Project Manager dedicated additional time to counsel *in situ* IT staff and users on how to identify, communicate, and manage the solution of problems found and the incorporation of new ideas to the system's continuous development.

The conceptual knowledge of the system's design and relations between tables as well as its proper management are aspects the cooperatives' IT staff should manage since without knowledge of these elements it would be impossible to solve problems that emerge during daily operations or to address new requirements in the future.

D.   **System Customization and Programming**

Since the Topaz system is completely flexible regarding the preparation of data capture or inputs, maintenance, consultations and output screens, the required customization process or programming of such operations demands a high level of quality programming.

This flexibility advantage to adjustments in institutional preferences means there is a need to have in place capable and effective staff. In this regard, it must be considered whether institutions with less experienced IT staff (due to the institution's scarce economic resources or lack of knowledge/interest from senior management about these areas) should acquire such versatile systems rather than less flexible systems that do not require such active participation in their customization. However, it also must be considered that one of the advantages provided by this flexibility lies in the ease of subsequently changing what is designed. This ability to modify the system was an advantage for the cooperatives considering that, at the moment of putting the system into production, they decided to redefine processes and, therefore, modify the system's operations.

With systems in which the user participates in programming and customization, it must be considered, during the selection and negotiation stages with the supplier, the establishment of quality control methods for programming in order to avoid unnecessary and tiresome efforts with users during module tests.

On the other hand, an important factor in this stage was the collaboration of the cooperatives' users. Even though this stage referred to the system's programming, many definition details such as forms, data, voucher content, and doubts over process flows had to be solved and reviewed by users.

One difficulty already mentioned above was the frequent absence of the staff from one of the cooperatives that resulted in poor participation in the final definitions and operational agreements and as a consequence several operations had to be redefined and modified in the

system while in production. What made this situation worse was the fact that the cooperative in question was the one with the most demands as it was in the process of getting regulated by the Superintendency of the Financial System.

The duration of this phase was extended due to the lack of product, processes and regulations definition at the cooperatives, as has been explained previously, in particular regarding credit applications, definitions for which FOMIR-DAI included a micro enterprise credit expert consultant to provide support to the cooperatives in the design of the final credits module. The delay would have been shorter if this consultant had been incorporated in the early stages or if all credit product policies and procedures had been previously and completely reviewed.

E. **Tests**

Both for programming and testing, one must consider that the Topaz system, as with most modern systems, is structured in two major modules: real time and automatic processes. The real time module operates on-line and continuously (that is, in real time), updating local and/or remote files, configuring a centralized information system and distributed processing. The automatic processing or central processing module works in batches and allows the automatization of operations with expiration dates and the generation of reports for accounting, control and management.

About Real Time Process Testing

One of the project's advantages was the consent of the cooperatives' staff users to perform module tests and the positive disposition, contribution and patience demonstrated. However, it was a tiring process since the quality of the finished products submitted to testing was inefficient. Users had to repeatedly run the same tests, besides finding errors that should have been detected by the programming staff before being providing to the final user for testing. Although most errors were corrected, the frequent observations and the constant users' visits to test the same modules were tiresome.

Hence, the recommendation for similar projects in the future is to demand from the supplier a quality control method for programming (prior to users' testing), besides the incorporation of standard validation, consistency checking, and verifications routines and other basic controls required by general audits of every banking system. Although this was incorporated into the system, the process and discussion with the supplier was unnecessarily annoying and the time invested by the project's management and users was significant.

Furthermore, although much time was invested in the definition of reports, these were not tested with real data during this phase since no real data was available to validate the information that was being generated (due to delays caused by the cooperatives during data migration, as explained below).

About Central Process Operations Tests

A difference is made between real time and central process since all the time planned for tests was consumed testing real time operations given the amount of errors found, and the time lag caused by the extended customization phase. Therefore, the central process was not tested according to plan. Besides, the supplier emphasized that these programs were already prepared, that they would not have major changes, that the tests were concentrated in the integration stage and, therefore, they would not require a major investment of time. The result of this was unsatisfactory as many errors were found in the central process, most of which were fixed in the parallel and later stages, which created inconveniences with user staff and even with clients.

Therefore, a strong recommendation is for early tests to be performed with real data since the use of sample fictitious data limits users' complete evaluation of the system's reliability.

F. **Migration**

Even after having made efforts from the start of the project to clean-up and complete the data in tables from the cooperatives' prior systems and having emphasized the impact of data migration between systems, migration was one of the most crucial and troublesome aspects of the project. This was due to the level of inconsistencies and manipulations of the original data (from the previous system) found, in addition to the lack of knowledge and dedication by IT staff from some of the cooperatives concerning the content and operating conditions of their previous systems, and the repeated lack of compliance in preparing the data requested by the supplier to design and conduct the migration program. This aspect of the project was the one in which the most user failure was observed and where they showed, in contrast to other activities, poor disposition and little effort to prepare and provide the information in a timely manner.

This meant that the tests were performed without real, resulting in errors not coming to light until the production phase, errors that should have been detected earlier.

In an attempt to compensate for this situation, the people from each cooperative responsible for coordinating activities related to data base clean-up were changed, and each credit union's accountant was assigned to the task. The situation did not improve significantly as due dates were repeatedly ignored, while inaccuracies and recurrent errors were found in the data provided to the supplier. Ultimately, the resulting migration program at one of the cooperatives generated so many errors and data inconsistency after production start-up that it was only resolved by hiring the supplier for extra time to fix it. No serious errors were found in the other two Cooperatives in this regard, and the situation was solved satisfactorily.

Therefore, the recommendation is for migration to receive special attention from those involved in the project and to have a specific time allocated to test the data and migration process since in this project it was always an activity parallel to others, without time exclusively dedicated to this crucial activity.

G. **Parallel and Production**

The planning of the parallel phase of the project was a positive aspect worth mentioning since each one of the requirements prior to its preparation was documented, scheduled, and with a

specific person responsible. Users responsible for each module actively participated in the activity, supporting their less experienced colleagues in the use of the system. The communication among those responsible for each module facilitated the execution of this activity. One of the negative aspects was, as mentioned earlier, conducting the parallel without reliable data (although real data were used, the migration still gave errors). The problem in working with data migrated with errors is that a point is reached where it is impossible to know if the error found comes from the migration or from calculations and processes performed by the system.

As mentioned earlier, reports were not tested until the production stage as all the real data were not available during the parallel phase.

After at least three weeks working with parallel systems, production start-up was launched simultaneously at all of the branches of each cooperative. During this last stage of production, several problems surfaced in the system related to accounting, the central process and the migration, which could have been avoided taking into account the considerations stated in the previous stages and mentioned earlier. The limited knowledge acquired by IT staff throughout the project at one of the three cooperatives, combined with the lack of discipline and management's patronizing attitude at these anomalies was critical.

Finally, it is important to mention that, at the institutional level, aspects such as the lack of proper communication between IT staff and users as well as the lack of methodologies for work planning, make the tasks of adapting to the new system and of enforcing effective control difficult. The result is an efficient system because of untimely decisions, lack of communication, lack of planning and assigning responsibilities and little control over the time and work performed. Also the lack of communication and organization among senior management, middle management and staff makes IT work difficult especially if users are not aware of policies and working standards as they will mistakenly take such problems as system errors.

IV.   Maintenance, Future Development and Use of the System

A.   Maintenance Contract

Once the license contract and the implementation contract have been defined, a maintenance contract also has to be defined with the supplier before starting the project. The scope of the contract has to be clearly defined with the target of obtaining the greatest possible guarantee from the supplier in this regard. In an extreme situation, if minimum requirements are not met, it is recommended to cancel the project with that supplier.

This contract has to clearly define the scope of the maintenance service, location of local staff, working hours, facilities, either the supplier's office or the company with which the supplier has an agreement to use their facilities. Likewise, the person(s) responsible for local assistance has to be approved, with respect to their expertise and the quality of their knowledge of the product. In case there is a change of any sort, it must be approved by the institutions to their entire satisfaction.

The mechanisms, the periodicity and scope of the new versions and the eventual impact and benefit that can be derived from implementing the new versions must be clearly defined. This is a delicate point since it is the user's guarantee of receiving assistance both in situations of normal problems as well as with new requirements. It is of great importance and it guarantees a good service.

One requirement would be the company's ability and commitment to update users on new product techniques, if any, as well as to offer product training regarding technical language, programming, databases as well as operations.

The license agreement must be entered with the supplier and the implementation agreement eventually can be entered with a subcontracted company, but with the necessary guarantees previously analyzed and approved by the buyer and the project's management (in this case, FOMIR-DAI).

Each cooperative is responsible for entering into a maintenance contract with the supplier (FOMIR-DAI only provided support on the contract's negotiation and definition). A conclusion in this project is that these issues were not managed as closely and seriously as the case demanded, although in the end the results achieved were as planned but only after additional efforts were exerted to reach the goals, especially regarding the maintenance contract.

B.   **IT Management**

The institution must have an information technology department capable of supporting the institution's current and future needs. Hence, it is necessary to hire qualified staff for the different areas that form the IT department in order to properly perform their duties and responsibilities.

For the department to operate according to the above, it requires a manager who responds to the current needs, who is integrated into the senior management team, and who can operate as an advisor in developing solutions to problems and contributing to the development of new products. Without good IT management, neither the current or future system maintenance and improvement goals can be met, without mentioning the development of new modules.

To this end, FOMIR held several workshops to support the institutions and developed materials to guide operations in these areas. It is each institution's responsibility to put these to practice. Good IT management is a guarantee for meeting the institution's needs as well as its integration with senior management and the development of future plans.

One of the culminating issues and lesson learned is that the lack of a qualified IT manager (which was true for at least one of the cooperatives) affected the development of the Topaz implementation project in practically all aspects, including technical, IT staff, and human resource management.

C.   **IT Help Desk**

Creating a Help Desk unit is an important part in the organization of a good IT department. This unit will address all problems related to the IT Department, including duties such as:

- Service and repair of computer equipment (PC);
- Resolve problems with the systems under development in the least possible time;
- Support and assist users in managing the systems or applications implemented;
- Resolve and maintain in optimal conditions the communication lines between the branches and the main office taking the necessary initiatives with suppliers;
- Coordinate with users and senior management special processes required by official institutions;
- Create the proper and efficient mechanisms for the unit's good and efficient performance of activities and duties for serving and controlling problems that arise.

None of the cooperatives had an existing unit or methodology prepared to respond to the great amount of problems and requests for additional systems development that come from users. Therefore, each cooperative had to develop and implement this operation during the post-production period. Ideally, it would be implemented before starting the parallel process in order to beer manage this stage and refine its operation.

D.   **Training of Users**

A fundamental topic of interest is the proper planning and execution of the training given to users on the new system and/or the new users. Following are some important points to be considered when planning the execution of training programs.

- Plan ahead of time;
- Prepare the necessary materials – PCs, manuals, data, logistic support material such as notebooks, white boards, to mention a few;
- Take into consideration users' time;
- Provide complete training in order to guarantee the system's or the module's proper and efficient use;
- Provide continued support to users during training;
- Be flexible in order to be able to repeat the training or part of it according to users' needs and/or difficulties;
- Provide theoretical and practical training;
- When a new system or module is implemented, this affects the institution's operation and production;
- The process of implementing a new system generates a change in the institution's processes and these have to be analyzed along with the management involved or affected, and this also could involve senior management and require additional training.

A poorly trained user can cause problems inherent to ignorance of the system's management and create a poor image for the institution that can be conveyed to the public.

In the case of the cooperatives, although a detailed training program was prepared, a reengineering of operational processes and policies was not performed prior to implementing Topaz. Therefore, these were not adjusted to the new system nor were staff trained on these modifications. Thus, the first weeks working with the new system were difficult and staff lacked the knowledge to respond to situations with clients. The required reengineering started only until months after launching the system in parallel. Related problems were observed mainly in credit where the most changes have been implemented, but deposits and accounting also were affected.

E.   **Future Development**

A system is neither static nor is it ever 100% complete since it may require changes and improvements, from users' needs, to incorporate new products, or as required by regulatory agencies such as the Superintendency of the Financial System or other government institutions.

These activities of managing requirements can be performed by IT department staff if it has the ability and the human and technical resources as well as the time and money. This is the case especially if the institution's IT department has developed the system. There is also the option of subcontracting or outsourcing these activities, either to qualified individuals or companies, while maintaining good control. Additionally, there is always the alternative of hiring the company that developed the system or module.

In the case of the cooperatives, two have had to hire additional programmers with more technical abilities than those they initially had in order to continue developing the system. Besides, they all have required additional post-production training, and certain development requirements will have to be performed by the company Top Systems, especially those related with the central processes.

There are certain important points to mention regarding ongoing system development, such as:
- Prepare an adequate plan, in regards to time, staff and resources;
- Create a plan that is feasible and credible in its execution;
- Manage time with good project management criteria;
- Analyze extensively the options that may arise within a logical framework;
- Define requirements with great accuracy;
- Include total participation of the best users;
- Ensure the institution's senior management participation and support;
- Create the proper project control and follow-up mechanisms;
- Anticipate users' training;
- Take into consideration IT staff training on new tools that may be required.

F.   **Others**

There are certain activities that need to be performed during the life of a system that require the proper control in order to prevent major problems in the system's operation. Some of these may be the following:

- Periodic analysis of communications lines' capacity to prevent congestion and, therefore, slow response time;
- Analyze performance of the database manager and perform periodic tuning activities to prevent loss of information quality and response time both for online and batch processes;
- Review periodically capacity and/or obsolescence of computer equipment: terminals, printers, central and remote servers, communication equipment;
- Maintain strict control on maintenance expenses, both hardware and software;
- Conduct periodic market studies of IT staff salaries and wages;
- Create incentives for IT staff such as: training on new programming tools, auditing and security, to mention a few.

V. Project Management, Communication and Logistics

A.   Roles and Responsibilities

Before starting the project, the roles and responsibilities were clearly defined for all the human resources involved in the project, from the supplier as well as from FOMIR-DAI and each cooperative.

Software Supplier:

- Project Director: responsible for planning, including definition of the system's customization and to assure the project's timely completion, specific project supervision on a short-term basis.

- Project Manager: responsible for the daily management of the system's customization, programming and training of cooperative staff, hired full-time during the life of the project.

- Central Process Manager: responsible for programming, had a part time contract, becoming full-time toward the end of the project.

- Senior Analyst: responsible for assuring customization complies with system's specifications, two full-time employees.

- Training Instructor: responsible for assuring that the cooperatives' employees learn to manage the system, generate required reports and provide system maintenance, was hired for one-month training.

- Senior Analyst: responsible for migration process programming, was hired part-time.

FOMIR/DAI:

- Project Manager: responsible for planning and managing the project jointly with the supplier's manager, coordination, communications with cooperatives, facilitate consensus processes and joint definitions; prepare and execute activities planned and support mediating between the cooperatives and the supplier. Initially hired part-time.

- Project Supervisor: responsible for supervising activities planned against performance, assuring compliance with terms of refe rence and contracts against products generated from communication with cooperatives' boards (*Consejos*) on problems and actions executed as well as final approval of finished modules. Hired for specific visits during the entire life of the project (approximately 20% of project's time).

- Assistant: responsible for managing general administrative services, office supplies and administrative budget of office expenses. Also responsible for preparing users' manuals on security, equipment and network, and preparing job descriptions for the cooperatives' IT departments. Helped with equipment, networks, and communications configurations and installations. Hired full-time during the life of the project.

Each Cooperative:

- Programmers: Two from ACACSEMERSA, two from ACACU and three from ACCOVI full-time during the project. One programmer from each of the cooperatives acted as the institution's representative, mainly to reach consensus on standards and formats to be used.

- One user responsible for each module: Usually the manager of the corresponding operational area with the responsibility for making decisions on product definitions and requirements, coordinating operations staff, testing the module and approving it. Full-time participation during requirement definition stages and on request for module tests. Those responsible were appointed during the initial strategic planning meeting (or primary analysis meeting) held with the cooperatives' presidents and other representatives.

- One person responsible for migration processes: Appointed during the initial strategic planning meeting and responsible for reviewing data consistency and correction as well as for providing the elements necessary to conduct the required migration programs.

Staff Modifications and Additions:

As the project progressed, additional human resources were incorporated into the work team with the following roles:

- FOMIR/DAI incorporated the project's Technical Director for general supervision and coordination with cooperatives' senior management, as well as facilitating and coordinating support from other areas intimately involved with the institutional development program such as the regularization and supervision advisor for one of the cooperatives. These two people worked part-time for the periodic supervisory and coordination meetings. FOMIR-DAI also incorporated an expert consultant on micro-credit analysis to support the definition and testing of the loan application module given the weaknesses found with the cooperatives' procedures as previously mentioned. Ultimately, the Project Manager's level of effort was increased to full-time during the entire project while time also was added for the post-production stage, increasing her responsibilities related to training and organization of cooperatives' IT staff.

- The software supplier, towards the third part of the project, hired an additional program analyst (paid jointly by FOMIR-DAI and one cooperative) to compensate for the delays and frequent absence of one of the cooperatives' programmers staff and its additional requirements from SFS. The supplier assigned an additional financial specialist for user on the accounting module.

- The cooperatives re-assigned the staff responsible for the migration toward the third phase of the project due to significant delays. The change also was required as those responsible for migration had to physically be at the cooperatives in order to coordinate correction and revision work, and since initially they were the programmers (located at the project's site in San Salvador) each cooperative had to appoint a new person responsible from the accounting area.

These changes were, in large part, appropriate and timely since they improved the project's control and the execution of priority activities. The only exception was the late entry of the credit consultant as she entered towards the end of the definition stage resulting in additional delays to this phase and required adjustments in the following stages. The only change that did not overcome persistent problems was that of the person responsible for the migration as failures persisted and results were unsatisfactory.

It is important, for other projects with systems similar to the TOPAZ methodology, to demand at the time of initial negotiations the following resources in addition to those mentioned earlier:

- Specialists for writing users manuals.

- Additional staff for updating technical manuals during project's execution.

- A person responsible for the programmers' quality control prior to user testing.

B.   **Project Planning**

Initial general planning: Preliminary activities were planned and executed before starting the project, among which the following can be mentioned:
- Communication and coordination meetings were held with the cooperatives' management and directors;
- Search, prepare and adjust the software project office;
- Revision and correction of databases of existing systems;
- Revision and updating hardware at each cooperative;
- Acquisition of software licenses;
- Meetings to discuss resources and pre-allocation availability.

Then, overall planning for the project was conducted using as a starting point the supplier's previous experience with other projects combined with this system's requirements and scope. This process served to plan and establish the project's initial activities, such as the following:
- Strategic meeting or primary analysis;

- Detailed analysis;
- Technical training.

Detailed planning: The project's detailed planning was performed for the immediate, medium and long range (end of project), starting with the definition of objectives, scope and information gathering and analysis performed during the detailed analysis stage. The resulting plan took into account human resources, the supplier's and clients' responsibilities, human-hours to be employed and the start and end dates of each stage.

Planning of each stage: Before starting each stage, a detailed plan was prepared taking into account the project's overall work plan.

FOMIR-DAI's project manager and supervisor designed detailed plans in consultation with the supplier's project manager and FOMIR's Technical Director and in communication with the cooperatives. Microsoft Project was used to prepare, present and control the work plan for each stage.

C.   **Planning Execution**

In general, the project's planned stages were executed within the initial plan. This was possible given the daily revisions and weekly progress reports. When the risk of delays or lack of compliance by any one of the parties was identified, these were immediately addressed by reporting them to the corresponding authorities through meetings called by the project managers. This control allowed for correction of deviations and taking action before problems appeared, and without such controls it would have been difficult to impossible to execute the project given the complexity in coordinating, reaching consensus and collaboration between the three cooperatives and the rest of the work team.

Although most stages were executed without major lags, the project had one major delay during post-production. One of the biggest lessons learned from the project happened during this stage, when tests and definitions were restructured and re-run due to errors and inconsistencies in migrated data. As mentioned previously, this was mainly due to repeated delays in data preparation and clean-up. These issues were not resolved satisfactorily despite repeated attempts by the project managers to bring the problem and solutions to the attention of the cooperatives involved.

At this point, it is important to consider for future projects performed by a group of institutions that failure to comply with commitments, changes in opinion, even omission of customization considerations especially in tests, dramatically affect the project as a whole and, therefore, the other institutions involved.

The greatest lag occurred during the system's credit and accounting tests. This delay was caused mainly by:

- Lack of definition regarding decisions on operational procedures and guidelines for loan applications and credit products.

- Delays and poor quality of migrating data. The cooperatives' staff did not have knowledge of existing tables and fields and the significant inconsistencies found in the data in the existing systems. As migrated data repeatedly demonstrated errors, tests could not be run with correct data and, thus, operational errors were not detected in a timely manner. The result: Additional time was invested in data correction during the post-production stage.

- Poor quality of operations prepared by the cooperatives' programmers resulting in repeated testing and programming.

- The supplier's delay to initiate testing the central process for the accounting and credit modules. In this regard, it is important to consider the application was offered under the assumption that batch programs (central processes) were standard for the product and, therefore, modifications to these would be minimum. This assumption was a great mistake and caused a difficult situation in which the supplier had to make significant changes in such processes. Many of these problems and changes were still under review in the postproduction stage.

D.   **Work Tools and Communication Methods**

An intensive communication system, with the corresponding parties depending on the situation, was established for the entire project. The result was that all responsible had knowledge of the plans and work style, of the activities performed, of the demands and expectations for each role and the existing problems. Most importantly, this intensive communication method provided the opportunity to openly state ideas and space for discussion, research and analysis, for questioning and agreements. Formal and informal, written and oral communications were used.

Formal communication involved:

- Quarterly meetings with the cooperatives' management and directors, held at hotels in the capital city to address macro aspects of the project:
  - The first one to establish the project's scope, work methodology, strategies and assignment of responsibilities;
  - The second one to inform on progress, ask for institutional participation, and demonstrate the system's finished client and savings modules;
  - The third one also was to inform on progress and setbacks, to demonstrate the loan applications module and ask for collaboration from all staff for the final testing, training, parallel and production stages.

- Constant meetings between project management and the cooperatives' general management to inform on the project's situation, of the common problems presented, and to make the necessary decisions to solve them in a timely manner.

- Meetings at the start and finish of each stage with staff involved to communicate plans, instruct on activities to be performed, clarify doubts and reach conclusions.

- Meetings with project management and each cooperative separately to solve specific problems and inform on particular situations related to that cooperative.

- Supervisory and follow-up meetings.

- Project management also used written communication with people responsible for modules and with the cooperatives' management including emails, faxes or delivery of written document through staff or messenger.

- Project management prepared and distributed minutes via email to participants from meetings held to follow-up on agreements reached and to state in writing commitments established during the meeting with dates and those responsible for the execution.

Detailed discussions and working meeting were held with operations staff and people responsible for modules and migration on definitions, revisions, tests and conclusions.

Informal communication included:

- Besides written communication, and frequently prior to such communication, telephone communication was used at all levels with the purpose of obtaining immediate feedback. Email also was used for summoning, clarification of concepts, distributing meeting minutes, etc. The cooperatives' managers visited the project's offices for meeting with project management.

- Constant meetings with technical staff assigned to the project, mainly at the start of each stage, the start of each module customization and, in general, to establish standards, clarify issues, communicate plans, instruct and provide guidelines on activities.

- With operational staff participating in testing, definition and revisions activities: Initial meetings to introduce plans, to instruct and provide guidelines on activities, introduce topics, discuss issues, reach consensus, brainstorm, reach conclusions, discuss changes, etc.

- Unplanned work meetings, group and individual, with one cooperative in particular or with all three, to discuss changes in plans, problems, clarifications, failures to comply with what had been established, etc.

This communication methodology had positive results:
- Users had the chance to get custom made products.
- Cooperative managers were informed by different means of activities performed in the project.
- Timely actions could be taken.
- Follow-up on agreements and assigning of responsibilities was facilitated.

E.   Project Documentation

Files were created at the start of the project to document the project's progress. The main folders were:

- Project progress file: Constituting the complete historical record and includes historical documentation kept during the life of the project and copies of relevant correspondence. The information is grouped by weekly progress reports which include:
  o Project status
  o Positive and negative issues
  o Products approved during the period
  o Graphical presentation of project progress
  o Causes affecting project development and consequences of deviations
  o New work plans produced
  o Description of potential risks
  o List of pending topics to resolve during the week
  o Annexes:
    ▪ Letters
    ▪ Memoranda
    ▪ Meeting agendas and minutes from the week
    ▪ Documents about definitions or agreements reached
    ▪ Documentation of module acceptance
    ▪ Any other documentation generated by the project.

- Office expenses control file: this contains a registry of monthly expense with corresponding receipts, invoices, service contracts, as well as letters and documentation related to office expenses.

- Test documentation file: which contains all relevant documentation used for testing, mainly matrixes used for checking operations and users' observations.

- Project documentation inventory. At the end of the project, all relevant documentation was stored and inventoried in boxes. These contain:
  - Documentation of software diagnostic, selection, and acquisition process
  - Project documentation:
    o Progress reports file
    o Office expenses control file
    o Test registry file
    o Project closing documentation (letters of project approval, delivery of technical documentation and user's manuals, delivery of source documents).

F.   **Modules and System Acceptance**

After testing each module and in order to document users' acceptance, the person responsible of each module from each cooperative signed an acceptance document. The integral tests included a review of the system in operation and interacting with all modules. These tests were performed both by operations staff as well as by key staff from middle and upper management.

Once modules were entirely approved, the person responsible for the module would sign in acceptance.

Meetings were held with the cooperatives' general managers and the director of the software company to formally accept the system. This process consisted of official acceptance letters, the system's documentation and source programs signed by both parties.

The system was formally accepted by the three cooperatives, with the latter requesting additional support from the supplier for resolving remaining problems and additional IT staff training. This additional support was provided to the three cooperatives, paid jointly by FOMIR/DAI and the cooperatives. The time allocation was more intensive at ACACU given the greater number of problems it faced due mainly to weaknesses in its technical staff.

As part of the project closing and in addition to activities described above, source code was delivered according to procedure established in the license contract. This source code is kept in safety deposit boxes at a local bank, which cannot be opened unless conditions agreed by both parties are fulfilled (user – supplier). Delivery of technical documentation and users' manuals was made via magnetic means and hard copies. Each cooperative signed an acceptance letter after reviewing the materials to make sure they were complete.

To assure continued support, the cooperatives signed a maintenance contract with the software supplier and meetings were held to clarify how the supplier would provide the maintenance service and how the cooperatives would use it. The supplier has a local company that will provide maintenance services according to the contract. This service will be effective immediately following completion of the additional support contracted for seven weeks during the post-production period.

G.   **Work Environment**

The work environment was a relevant factor influencing the productivity and commitment from project staff. Due to its relevance, it was the first issue observed in this document in the section regarding the system's customization process. The cooperatives' staff integration, communication and collaboration were fundamental and came spontaneously and immediately. User staff that participated in project on request was another positive element in generating a participative work environment.

Even with this type of project that entails a great amount of time – adding to this constant and necessary discussion meetings to reach consensus, prevent and solve problems – the general work environment was the right one to achieve the successful completion of the project.

Although it might seem obvious to mention the following points, as they were so critical in this project, they are worth stating. The institutions' management should consider solutions that do not demotivate the staff assigned to the project. Additional incentives can be put in place for the special work to be performed such as adequate and safe lodging, providing funds for transportation and proper food, considering that the staff will be required to stay away from

home for extended periods of time. The cost of food and lodging is less than the consequences generated if such are not offered in this type of project.

Regarding staff motivation, during the project some cooperatives started to use staff assigned full time to the project for other tasks, which created important absenteeism and low levels of discipline among the group. They also would authorize frequent leaves of absence. The remaining colleagues started complaining and the results were increased tardiness and unjustified absences. This situation was presented to the cooperatives' management and was resolved after many meetings, calls, even talks with the boards regarding such anomalies. A change of staff took place at one of the cooperatives and an additional consultant was hired, which added to costs, although necessary, for the cooperative and FOMIR-DAI project.

VI. Project Costs and Subsidies

A.   Costs Categories and Amounts

A project of this sort has several costs components including software and database licenses, the customization process, maintenance, hardware and communications, training and hiring of new staff, and consultancies for project management. In total, FOMIR-DAI estimates that it invested approximately $1.1 million, around 70% in hardware and software and 30% in training and the project management consultancy. The cooperatives invested approximately $300,000, around 66% en hardware, software and communications and the remaining in staff directly involved in the project. Some of these are fixed costs (such as project management staff and customization costs) and would not vary much with projects for bigger or smaller institutions, or to incorporate more or fewer institutions, while others, such as licenses and equipment, do vary according to the size of the participant institutions.

B.   How to Structure Subsidies and Responsibility for Costs

For this project, FOMIR-DAI assumed much of the technical responsibility as well as a significant portion of the direct costs. In this manner, it assured the quality of the product and process and time for development. However, this project has shown that when the institutions get a large hand-out, they do not become sufficiently committed to the project or make sufficient efforts in pursuit of the objectives.

Learning from this experience, alternative financing schemes should be sought in similar projects in order to make the institutions more responsible about their commitments from the beginning. For instance, they should be responsible for paying the total or near the total cost of licenses, while a fund can be created to which they can turn for a loan and repay it at an attractive interest rate and term. In this way, these institutions and others would have access to funds in the future for updating their systems. DAI is trying this type of mechanism in Ecuador for a similar project.

Regarding the payment process to suppliers, this should be against products or tangible deliverables satisfactorily received and accepted by the user and/or DAI. Likewise, the responsibility for payment approval should be the user's and not the contractor (in this case DAI). Although DAI has knowledgeable staff in the corresponding technical and operational

areas, DAI cannot be responsible for the final product that, from its concept to its final acceptance, will be the user's responsibility. However, DAI can ratify acceptance and, in case it has the contract with the supplier, make the payment, as in FOMIR's case.

To assure the project's success, the institutions must appoint highly qualified staff, in terms of their expertise and decision making power, who have the necessary time available to dedicate to the project. This is necessary to avoid project delays and to obtain a high quality product within the established time. In this project, the cooperatives appointed technical resources that did not comply with the necessary requirements. The recommendation for future projects such as this one is to consider partial and decreasing subsidies over time (the total salary would eventually be paid by the institutions) in order to assure qualified technical staff is hired, not only for the project but also for the system's management, maintenance, and future development.

As has been the case in similar IT projects executed in El Salvador without the direct involvement in project management of FOMIR-DAI technical consultants, that significant delays (more than one year) and serious problems (loan calculations and portfolio balances, for instance) occurred. These problems did not happen in the case of the project with the cooperatives in large part due to the full-time FOMIR Project Supervisor appointed, as well as the more significant supervision and institutional support for this project. Therefore, the recommendations is for DAI or the institutional development project manager to appoint a full-time Project Manager in order to guarantee the project's good performance, both in time and resources as well as to ensure delivery of a quality product.

VII.   System Review by the Superintendency of the Financial System

This is a delicate point since it is not easy to involve the Superintendency in a project of such magnitude because in general it lacks the required staff, time and resources for such. However, waiting until the system is finished for its final analysis and modification are factors that negatively impact the supplier and the project and could negatively affect the system's operation by introducing errors into the modules, not to mention possible delays in system start-up. Another aspect could be the cost involved to make corrections which are the supplier's responsibility as the latter may not accept performing additional and/or corrective work at no extra charge.

For this project, the SFS's involvement was minimal in part due to its scarce technical staff and in part because of the regulating cooperative's resistance to involve the SFS at an earlier stage. However, the project did establish communication with SFS staff and to the extent possible their observations were incorporated into the system, although in some cases not at an optimal time thus entailing additional work, costs and time.

The recommendation is, to the extent possible, to involve Superintendency's staff from the beginning. This requires a joint effort and convincing them of the importance of their participation for the benefit of the institutions to be supervised in obtaining a product according to their requirements. Thus, the recommendation is to involve the Superintendency from the beginning of the project, to maintain periodic meetings with them to keep them informed and to establish participatory agreements with them to advise on their responsibilities.

VIII.   Summary of Lessons and Recommendations

The lessons learned during this project have been presented throughout this entire document. Following is a summary of key lessons which should be considered for similar projects.

- Specify y gain commitment on the institutional commitment to change and prepare for organizational and operational reengineering.

- Determine support and gain commitment from the institution's directors and senior management for an IT project.

- Align the IT plan to the institution's strategic plan.

- Maintain permanent communication and supervision during the entire process, from system selection to implementation.

- Secure and establish staff before and after implementation; do not start a system customization project without the required and competent IT staff.

- Establish a responsible internal work group who feels that it owns the project.

- Have in place an IT structure with sufficient, qualified staff.

- Conduct adequate and timely training of IT staff in the areas and tools to be used in the development project.

- Promote active participation of qualified users in all implementation stages of the development of an information system.

- Discuss, previous to implementation, the logistics for technology changes with all areas involved.

- Ensure the technology platform is based on state-of-the-art technology that is consistent and on equal footing with operational and business development.

- Have a capable, dedicated and responsible project manager and, if possible, with experience on similar projects.

- Understand that the main actor in a financial intermediary is the CLIENT.

- Use technology properly which can result in important savings in time, money and human resources, and at the same time improve client satisfaction.

- Do not assume ANYTHING.

- Seek to apply and improve similar experiences.

- Prepare a document on the operational requirements of the optimal system desired, which will simplify proposal evaluation.

- Select integral solutions and consider all components with a holistic and forward looking vision.

- Verify closely the benefits the supplier offers.

- State in the contract all requirements and commitments with the supplier.

- State in writing the maintenance service conditions, types and guarantees offered by the supplier.

- Follow closely a recognized methodology for project development and implementation for its effectiveness and results.

- Prepare budgets to invest in:
    - Hardware and software initial investment
    - Hardware and software upgrades
    - Security (physical and contingencies)
    - Communications
    - Qualified staff (IT and user)
    - Training

- Consider implementing communications under the following schemes, based on budget availability and possible suppliers' facilities:
    - Point to Point VPN
    - Dedicated links VPN- microwave or optical fiber
    - Radio linking
    - Dial-up
    - Combination of the above.

- Understand the importance of planning and participation of all levels of the institution.

- Acknowledge that a technological change entails operational changes and thus it requires review of policies, procedures and documents prior to definition of the system's requirements.

- Plan properly for post-implementation.

- Manage the deliverables' schedule.

- Establish clearly the parameters with the users and supplier.

- Clean-up data prior to the migration processes.

- Establish and utilize audit controls throughout the entire implementation process.

- Customize training and conduct it by functional area and by modules. Include operational policies and process as well as use of the new system.

- Perform exhaustive tests on communications, databases, operating and application systems.

- Develop transactional pilot tests in locations close to the main office.

- Define and initiate the pilot project with a small, select group.

- Implement the system, to the extent possible, by module and by branch.

- Distribute cost coverage in such a way that each party feels responsible for project commitment and compliance.

- Involve supervisory authorities from the beginning of the process to incorporate their perspective into the system.

IX.   Annexes

A.   **ACCOVI Initial Evaluation (*ACCOVI Evaluación Inicial*)**
B.   **Format for Presentation of Economic and Technical Proposals (*Formato Presentación Económica y Especificaciones Técnicas*)**
C.   **System Evaluation Matrix (*Matriz de Evaluación de Sistemas*)**
D.   **Summary of Proposal Evaluations**
E.   **License Contract (*Contrato Licencia*)**
F.   **Installation and Training Contract (*Contrato de Instalación y Capacitación*)**
G.   **Work Plan (*Plan de Trabajo*)**

ANNEX D
SUMMARY OF PROPOSAL EVALUATIONS

TOP SYSTEM was ranked highest by the technical team due to the following factors:
- Among the 21 criteria related to the systems requirements, TS scored the highest. TS was ranked superior in 14 of 21 categories and equal in 4 other categories. Among others they were judged superior in account structure and account access, saving certificates, lending requirements, transaction and on-line transaction history, member statements, payroll, accounting and systems security.
- The system was determined to be user friendly and capable of being modified by user, therefore judged to have a low degree of provider dependence for the Credit Union.
- The systems did not require a specialized data base and software tools.
- It was considered to be user friendly for developing new products.
- Among the three, it was the only system that is Internet integrated.
- Among the three, the system was judged to have the lowest level of software, hardware and personnel requirements for customization.
- It was judged to have the lower cost of training.
- It had strong recommendations by current client users.
- The price quoted was second lowest among three.

In respect to **ASI** (Arango software), the following was noted:
- Among the 21 criteria related to the systems requirements, ASI scored the second highest technical ranking. ASI was judged superior in 3 of 21 categories and equal in 4 categories. ASI was judged superior in standing order accounts, fixed assets and budgeting.
- ASI required a specialized data base and software tools.
- ASI received fair recommendations for client users
- Option 1, which called for individual implementation, called for installation of software by ASI and customization of software by the credit unions. FOMIR did not find this a viable option, as the credit unions lack technical staff required for independent customization.
- The price quoted was highest at $1,244,362.

In respect to **SYSCOM**, the following was noted:
- In all 21 criteria related to systems specifications, SYSCOM was ranked lowest and did not provide the following specifications: verification and levies, electronic services, ACH receipts and organization, investments, and inadequate lending requirements and system security.
- FOMIR received negative references from the credit unions due to a failed installation with Accovi, Acacu and Acacsamersa in FY 2000.
- SYSCOM proposed the lowest price.